

IN THE UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF NEW YORK

UNITED STATES OF AMERICA

v.

ZHENG Xiaoqing and
ZHANG Zhaoxi

Defendants.

) Criminal No.
) 1:19-CR-156-MAD
) **Superseding Indictment**
)
) Violation(s): 18 U.S.C. §§ 1831, 1832, 1001
)
)
) 14 counts
)
) County of Offense: Schenectady



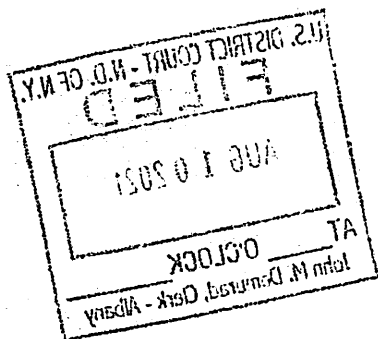
THE GRAND JURY CHARGES:

Introduction

At all times relevant to this indictment:

1. Turbomachines serve as a source of power for a wide variety of applications. Three types of turbomachines that provide power on a large scale are steam turbines, gas turbines, and aviation engines. Steam turbines convert steam to power, whereas gas turbines and aviation engines generate power through the combustion of a mixture of air and fuel. Steam and gas turbines are commonly used in a wide variety of applications, including electricity generation, oil and gas, and heating. Aviation engines are commonly used for providing thrust for airplanes but may also be used in power generation and other purposes. Turbomachines use a variety of components that are specifically engineered to optimize turbine performance and efficiency while withstanding the harsh operating environment inside a gas or steam turbine or aviation engine. Such components include turbine blades, turbine seals, and in the case of gas turbines and aviation engines, combustion systems.

2. According to the “Made in China 2025” initiative announced by the government of the People’s Republic of China (the “PRC” or “China”) in 2015, the PRC seeks to enhance the



country's innovation, productivity, quality, digitalization and efficiency. The Made in China 2025 initiative targets ten sectors, including aerospace, aviation equipment, and power generation. Additionally, the PRC's Thirteenth Five-Year Plan listed aviation engines and gas turbines as a major project for 2030, including research on materials and manufacturing processes. Gas turbines that power aircraft are central to the development of the aviation industry in the PRC.

3. General Electric Corp. (along with its subsidiaries, "GE") manufactures gas and steam turbines through its Power Division ("GE Power") and gas turbines through its Aviation Division ("GE Aviation").

4. Aware of the PRC's national priority, individuals and companies named and unnamed in this Indictment obtained, without authorization, GE trade secrets related to the design and manufacture of gas and steam turbines, including turbine blades and turbine seals. That information was obtained, without authorization, with knowledge and intent that the theft of such information would benefit the Chinese government and entities owned, controlled, sponsored, commanded, managed, and dominated by the Chinese government.

The Defendants

5. ZHENG Xiaoqing is a 58 year old U.S. citizen of Chinese descent. ZHENG has degrees from Northwestern Polytechnical University and Massachusetts Institute of Technology in "turbomachinery" fields. ZHENG was hired by GE in 2008 to work as a senior sealing engineer in the steam turbine design group. Since being hired, ZHENG has worked, full time, for GE Power in Schenectady County, NY. Since 2010, ZHENG worked on various leakage containment technologies in steam turbine engineering, including advance brush seals, rotating brush seals, and tip brush seals. More recently, as GE's technology has evolved, ZHENG has participated in development of next-generation products, including rotating brush seals and carbon seals.

6. ZHANG Zhaoxi is a 46 year-old Chinese citizen. ZHANG and ZHENG are related by marriage—ZHANG's aunt is married to ZHENG.

7. Liaoning Tianyi Aviation Technology Co., Ltd. ("LTAT") is a company established by ZHANG in or around April 2016. ZHANG is the majority owner of the company and holds approximately 55% of its shares. According to an Equity Holding Agreement executed by ZHENG, dated April 8, 2016, ZHENG holds 45% of the shares.

8. Nanjing Tianyi Avi Tech Co. Ltd. ("NTAT") is a company established by ZHENG and others in China in or around April 2016.

9. LTAT and NTAT share the same logo. While they are separate companies, LTAT and NTAT function as separate divisions of an organization that aims to develop and manufacture parts for turbines. NTAT focuses primarily on research and development, while LTAT focuses primarily on manufacturing. For example, according to an agreement between LTAT and NTAT, dated July 30, 2017, and signed by ZHENG on August 4, 2017 on behalf of NTAT, NTAT was to develop sample end seals and deliver the samples and a complete research and development technical report to LTAT.

GE's Instruction to ZHENG Regarding His Chinese Company

10. In February 2016, ZHENG disclosed to GE Power that he was operating an aviation parts supply business in China with his brothers. Specifically, ZHENG disclosed that he had registered a small company in China with his brothers. ZHENG explained that the plan for the company was to become a "supplier of pipe joints, bearing oil seals that might be drawn on [his] prior experience with another company that [he] worked [at] 8 years ago, before [he] joined GE [Power]." ZHENG sought confirmation that ZHENG's participation in the business in China did not violate GE's conflict of interest policies.

11. After considering the request, GE Power advised ZHENG that he could proceed with the business, subject to certain limitations. Among other things, counsel for GE Power advised ZHENG:

[Y]ou must be extremely careful to avoid using GE intellectual property, proprietary information or proprietary processes. Although you should not use knowledge and skills acquired as a GE employee, before your company becomes or if your company has become a part supplier to a company which may compete with GE Aviation, be sure to fully inform your manager and ask your GE business' Legal/Compliance counsel for advice. Should the situation change in the future, please notify your manager and complete another on-line submission of the conflict of interest form.

12. ZHENG did not submit any further notifications to GE Power's Legal/Compliance counsel concerning his business activities in China, nor did ZHENG inform his manager of the conduct described below at Paragraphs 24 – 79.

GE Technology

13. GE Aviation and GE Power design and manufacture, among other things, gas and steam turbine engines. Both gas and steam turbines rely on a series of specifically designed seals within the turbine engine in order to optimize performance of the turbine, whether by increasing power or efficiency or extending the usable life of the engine. Certain gas and steam turbines also rely on a series of specifically designed turbine "blades" that serve as a main component of the power generation technology for the turbine.

14. Gas and steam turbines operate on the similar principles and utilize many of the same or similar components. Accordingly, trade secrets and proprietary information developed by GE concerning the design and manufacture of steam turbines can be applied to the design and manufacture of gas turbines.

15. GE's design of gas and steam turbine engines includes, but is not limited to, the following categories of proprietary technology, each of which meets the definition of trade secrets, as defined in 18 U.S.C. § 1839(3):

- a. Trade Secret Category 1: Design models, engineering drawings, and material specifications, and other information related to metal brush seals used in steam and gas turbines.
- b. Trade Secret Category 2: Design models, engineering drawings, and other information related to seal testing systems (i.e., test rigs) used to test the performance of seals used in steam and gas turbines.
- c. Trade Secret Category 3: Design models, engineering drawings, material specifications, and other information related to turbine blades for specific models of gas turbine engines.
- d. Trade Secret Category 4: Design models, engineering drawings, material specifications, and other information related to the turbine combustion chamber, including fuel nozzles associated therewith, for specific models of the F-class gas turbine engine.
- e. Trade Secret Category 5: Configuration files, design data, design models, and other information specific to viewing and modeling GE's technologies related to sealing and optimizing turbine technology.

16. The information contained in Trade Secrets Categories 1 – 5 derived independent economic value from not being generally known to, and not being readily ascertainable through proper means by, another person who could obtain economic value from the disclosure and use of the information.

17. The combined value of Trade Secrets Categories 1 – 5 was millions of dollars, including expenses for research and design and other costs of reproducing the trade secrets that ZHENG avoided by the actions alleged herein.

18. GE Power took reasonable measures to protect GE trade secrets, including those referred to in Counts 1 – 13, including the following measures:

- a. GE Power maintained perimeter security to restrict access to the property, particular buildings, and facilities.
- b. GE Power required visitors to register with security, wear visitor badges, and be escorted by approved personnel.
- c. Access to GE Power's computer system required an assigned log-in and password. At log-in, GE Power's computer monitors displayed a security banner advising employees that the computer system is available to them for work-related reasons and is subject to monitoring.
- d. Access to systems containing GE Power's proprietary information required higher levels of authorization, controlled electronically and limited to groups of employees with a need to access the information.
- e. GE Power employees were required to sign proprietary information agreements and were advised that any inventions or innovations they may create while an employee are the property of GE Power.
- f. GE Power required employees to disclose inventions deriving from work at GE Power.

- g. GE Power required its employees to complete annual training requirements on GE Power's policies and expected code of conduct, including how to properly handle GE's proprietary information and trade secrets.
- h. GE Power utilized a data classification policy to classify, label, and store all GE data. GE Power's policies on the use and handling of its confidential and proprietary information were communicated to GE Power employees during training, in employee handbooks, through oral warnings at company meetings, and on signs or banners posted in the workplace.
- i. GE prohibited the use of USB drives starting in 2017 and took steps to ensure GE Power computer systems would not permit the use of thumb drives.

Background to the Investigation

19. From in or about November through in or about December 2017, GE Power discovered that a large number of encrypted files had been saved on ZHENG's work computer. The files were encrypted using a program called AxCrypt, which is a program that is not provided by GE Power to its employees. Following GE Power's discovery of the encrypted files on ZHENG's GE-issued computer, GE Power installed monitoring software in an attempt to determine what information he was encrypting, and what he was doing with the information (e.g., transferring it elsewhere).

20. During the process of monitoring ZHENG's activities on his computer(s), GE Power discovered that on or about July 5, 2018, ZHENG moved approximately 40 encrypted files to a "temp folder" on his company-issued desktop computer located in his dedicated workspace at GE Power. GE Power determined that the files related to sealing and optimizing turbine technology – information that GE considers to be proprietary and secret. ZHENG used

“steganography” (i.e., a means of hiding a data file within the code of another data file) to remove the files from GE Power’s facilities. Through the steganography technique, ZHENG placed the aforementioned electronic files into the binary code of a separate electronic file on the computer—an otherwise innocuous-looking digital photograph of a sunset. ZHENG then e-mailed the digital photograph file of the sunset, which secretly contained the hidden GE electronic files containing GE’s proprietary data, from his GE-provided email address (“ZHENG GE Email Account”) to his personal e-mail address at Hotmail (“ZHENG Hotmail Account”).

21. On August 1, 2018, agents with the FBI interviewed ZHENG. During the interview, ZHENG made a number of statements, including, in sum and substance that it is normally very difficult to unlawfully take any of GE’s proprietary property due to the security measures in place at GE; that despite the difficulties inherent in attempting to take GE’s property, he used the steganography process on July 5, 2018 to take multiple electronic files belonging to GE that contained data about turbine technology; that he had previously used steganography on fewer than ten prior occasions to take materials that belonged to GE off of GE’s systems; and that his companies in China are not yet profitable, but have received grant money and funding from the government of China.

COUNT 1
[Conspiracy to Commit Economic Espionage]

22. The allegations contained in Paragraphs 1 – 21 are re-alleged and incorporated as if fully set forth herein.

23. From at least March 2016 through on or about August 1, 2018, in the Northern District of New York and elsewhere, defendants **ZHENG Xiaoqing** and **ZHANG Zhaoxi** and others conspired to:

- a. knowingly steal and without authorization appropriate, take, carry away, and conceal, and by fraud, artifice, and deception obtain trade secrets belonging to GE; and
- b. knowingly and without authorization copy, duplicate, sketch, draw, photograph, download, upload, alter, destroy, photocopy, replicate, transmit, deliver, send, mail, communicate, and convey trade secrets belonging to GE; and
- c. knowingly receive, buy, and possess trade secrets belonging to GE, knowing the same to have been stolen, appropriated, obtained, and converted without authorization;

intending and knowing that the offenses would benefit a foreign government, namely the PRC, and one or more foreign instrumentalities, including LTAT, NTAT, Shenyang Aerospace University, Shenyang Aeroengine Research Institute, and Huaihai Institute of Technology (together, “Foreign Instrumentalities”).

Manner and Means of the Conspiracy

24. On or about January 16, 2016, ZHANG sent an encrypted text message to ZHENG and described the manufacturing facilities at a company he had formed in 2013, Liaoning Shuntong Machinery Technology Co., Ltd. ZHANG explained, in substance and relevant part, that he had a foundry, a heat treatment plant, and a machining and assembly plant.

25. On or about January 16, 2016, ZHANG sent an encrypted text message to ZHENG and provided his personal email addresses during an encrypted conversation. ZHANG provided one account on @qq.com (the “ZHANG QQ Account”) and another account on @163.com. The

email service providers for @qq.com and @163.com are both based in China. Accordingly, emails sent to @qq.com and @163.com are physically hosted in China.

26. On or about March 17, 2016, ZHANG sent an encrypted text message to ZHENG. ZHANG wrote, in relevant part, that a local Chinese “governor” planned to visit “our company” on the 27th and that ZHANG intended to talk to the governor again to determine what kind of support the governor could provide.¹

27. On or about March 19, 2016, ZHANG sent an encrypted text message to ZHENG. ZHANG wrote, in relevant part, that ZHANG had a very good meeting with the “leaders” and that they were “very interested” in ZHENG.

28. In a separate encrypted text message on or about March 16, 2016, ZHENG wrote, in relevant part, that there was time to change the design of the research plant and that ZHANG was looking to ZHENG to provide a solution. ZHANG then described the current design of the factory and its location through words and pictures.

29. On or about March 22, 2016, ZHENG and ZHANG exchanged encrypted text messages regarding the name of their new company that would become LTAT, which ZHENG initially proposed as “Tianyi Aeronautics.” ZHENG proposed that LTAT should describe the scope of its operations as: the design, manufacturing, and sales of impeller machinery, oil and gas sealing solutions, and hydraulic sealing products; the development, experimental verification, design, manufacturing, and sales of aircraft engine sealing technology.

30. On or about March 30, 2016, ZHENG sent an encrypted text message to ZHANG in which ZHENG wrote, in substance and in part, that ZHENG had not had time to prepare the

¹ Communications between ZHENG and ZHANG are translations from communications that were not originally in English.

plant design and asked ZHANG if he still needed it. ZHANG replied that he did still need it, and that ZHANG was currently working on registration of the company. ZHANG noted that the party secretary came to visit the factory that day.

31. On or about April 6, 2016, ZHANG and ZHENG exchanged encrypted text messages. ZHANG explained that the local vice governor of industry had visited the factory and that ZHANG had briefed the vice governor of industry on the project. ZHANG sent photographs of the event.

32. On or about April 8, 2016, ZHENG executed an Equity Holding Agreement by which ZHENG would hold a 45% ownership in LTAT.

33. On or about August 3, 2016, ZHENG sent an encrypted text message to ZHANG in which ZHENG wrote, in substance and in part, that he had put together a set of product design drawings based on ZHENG's original product design.

34. On or about August 26, 2016, ZHANG sent an encrypted audio file to ZHENG in which ZHANG stated, in substance and in part, that the application for 50 million RMB² with the province was almost in place and that the Provincial Standing Committee had already approved it. ZHANG stated that it would resolve a lot of things once they received the money. ZHANG explained that the probation period was two years. ZHANG subsequently explained that the government investment to be received by the company was part interest-free loan and part subsidy.

35. On or about October 9, 2016, ZHANG sent an encrypted audio file to ZHENG in which ZHANG asked whether the data that ZHENG had sent previously was for the capability of GE's largest one.

² Renminbi (RMB) is the official currency of the PRC.

36. On or about October 10, 2016, ZHENG sent a series of encrypted text messages to ZHANG in which ZHENG explained certain items that would be needed to manufacture brush seals, including a large vacuum electron beam welding equipment, wire cutting machine, and heat treatment furnace.

37. On or about October 18, 2016, ZHANG sent an encrypted audio file to ZHENG in which ZHANG stated, in substance and in part, we have to get this one plant going and making money. Even if just simple seals, we have to get something going. Otherwise the government will question why nothing is happening.

38. On or about October 20, 2016, ZHANG sent an encrypted audio file to ZHENG in which ZHANG stated they needed to approach the Ministry of Aviation for funding.

39. On or about December 16, 2016, ZHANG visited the GE Power facility in Schenectady, New York. According to GE's records, ZHANG's visit was hosted by ZHENG. The visitor log indicates that the purpose of ZHANG's visit was a "meeting."

40. On or about December 29, 2016, ZHANG sent a series of encrypted text messages to ZHENG in which ZHANG wrote that he planned to talk to the "party-secretary" about a cooperation agreement.

41. In January 2017, ZHENG visited China. As they planned for the visit, ZHANG sent an encrypted text message to ZHENG on or about January 18, 2017, in which he wrote that ZHENG should expect things to be hectic during his visit. ZHANG wrote, in substance and in part, that ZHANG would take ZHENG around to meet everyone and "all of the units/departments." ZHANG also mentioned "all kinds of VIPs" with whom they should meet, including the Mayor, the Municipal Party Secretary, the County Party Secretary, and the County Magistrate. ZHANG

also indicated that they should plan to address the matters of “real interest,” like the technology arrangements.

42. On or about January 19, 2017, ZHENG sent an encrypted text message to ZHANG in which ZHENG asked for help in buying a ticket to Shenyang, China on China Air Flight 1625.

43. On or about January 22, 2017, ZHENG sent an encrypted text message to ZHANG that included prepared remarks. The prepared remarks included the following statements, in substance and in part:

On behalf of Tianyi Aeronautics, I offer my sincerest gratitude to the leadership of the Municipal Party Committee, City Hall, the County Party Committee, and the County Government for the consideration and support you have shown us. Today, feeling much obliged, I am here to report how the project is progressing.

We purchased the [] property and plant. We retrofitted the old plant’s foundation to meet the needs of machining equipment. We planned for and ordered process equipment. We finalized the design for the laboratory’s test stand(s) . . . We have also opened up channels to bring in high-precision materials and cultivate suppliers. All this in just the last six months.

We have gained a more profound appreciation for real-world applications during these months. In June, we met with and briefed [] President of the Aero Engine Corporation of China, and [] President of the Aero Engine Academy of China. We then delivered an academic presentation at Northwestern Polytechnical University. The 606 Institute [i.e., the Shenyang Aeroengine Research Institute], the Chinese Aeronautical Establishment, and numerous academic institutions were all in attendance. Through the technology exchange we gained more clarity on China’s current state of technical capabilities and remain confident in our world-leading know-how. The Party Secretary also accompanied us to the 606 Institute in June. The exchange of ideas that took place has laid the foundation for our aerospace sealing research center.

Presently we are working toward a strategic partnership among the 606 Institute, Shenyang Aerospace University (SAU), and Tianyi. After Chinese New Year, the 606 Institute and SAU will be visiting Liaoyang to further discuss the cooperation and construction of the R&D center. We respectfully request the leadership’s full support.

Facilitated by the leadership, we resolve to establish ourselves as the Liaoyang area’s industry leader in aircraft engine technology. Aerospace products usually spur on the development of other related technologies by at least threefold.

Our sealing products will usher in the digital twin concept in terms of smart design and intelligent manufacturing, the first in the world to do so.

...

The 13th Five-Year Plan places aerospace development as a priority among its strategic key technology projects. A year has since passed. I feel the sense of urgency more than ever. Therefore, I am here to ask the leadership to give the development of this national key technology project the special attention it deserves, without reservation. Please do the extraordinary and move this strategic industry and advanced manufacturing technology forward in the area, rightly making it a Liaoyang specialty industry.

44. On or about March 19, 2017, ZHENG and ZHANG exchanged encrypted text messages concerning the purchase of raw materials for the manufacture of brush seals. ZHENG explained that he did not want to approach the sealing companies that supply semi-finished products to GE until ZHENG was certain of leaving GE.

45. On or about May 2, 2017, ZHENG sent an encrypted text message to ZHANG that read, in substance and in part, that brushed tool maps and 3D models had been sent to ZHENG. ZHENG added that he would send a process flow diagram the following day. ZHENG then provided a specific eight-digit alpha-numeric password ("Password #1") to ZHANG.

46. On or about July 3, 2017, ZHENG sent an encrypted text message to ZHANG that read, in substance and in part, that ZHENG had a few samples to show people in China, but that if he were to bring them, others would know that they are not made by ZHENG and ZHANG because there is no equipment or personnel at their Chinese companies.

47. According to a draft Technology Development Contract, dated July 30, 2017, LTAT and Huaihai Institute of Technology (HHIT) entered into an agreement to develop and produce samples of face seals used in turbines. According to the draft contract, LTAT was to provide to HHIT the design specifications (i.e., as specified in the contract, technical data, including basic equipment drawings, finishing technology specifications, required finishing

parameters, finishing quality standards, required testing/inspection parameters, and manufacturing process specifications), and HHIT was to produce sample seals. Subsequent communications indicate that ZHENG and ZHANG, through LTAT and NTAT, entered into contracts coincident with HHIT to purchase raw materials for the production of seals. For example, on or about December 28, 2017, ZHENG sent ZHANG a PDF of a supply contract and introduced it by saying this part was bought by LTAT and the other half by HHIT, and that the materials were to be used for sample preparation.

48. On or about August 9, 2017, ZHANG sent an encrypted audio file to ZHENG in which ZHANG asked ZHENG, in substance and in part, to send the GE materials to the ZHANG QQ Account. ZHANG explained that he would print them out and have the people in the research division conduct research and produce the materials.

49. On or about August 12, 2017, ZHENG sent a series of encrypted text messages to ZHANG, in which ZHENG wrote that he had sent a new brush filament sample and asked whether ZHANG received the download. ZHANG responded he had downloaded the file. ZHENG then wrote, in substance and in part, the mail is a packaged run file, and that ZHANG could unlock it using a password. ZHENG then sent Password #1 to ZHANG.

50. On or about August 20, 2017, ZHANG sent an encrypted audio file to ZHENG and posed questions about how to interpret the brush drawings.

51. As discussed in detail below at Paragraphs 71 - 72, on or about August 22, 2017, ZHENG sent GE proprietary information related to Trade Secret Category 1 to ZHANG. Specifically, ZHENG sent ZHANG a five-page design schematic for the manufacture of a particular metal brush seal used in steam turbines ("Brush Seal A").

52. On or about August 23, 2017, ZHENG sent an encrypted text message to ZHANG that read, in substance and in part, I've sent everything to you. Have you received them? In response, ZHANG asked for the code. ZHENG replied that it was the same passcode as last time.

53. On or about August 29, 2017, ZHANG sent an encrypted audio file to ZHENG in which ZHANG explained that the drawings that he had received were for the brush, and that ZHANG needed the test machine drawings.

54. On or about September 1, 2017, ZHENG sent an encrypted text message to ZHANG that read, in substance and in part, model email to your Q mailbox. ZHENG then wrote, after downloading, don't forget to delete. ZHENG further explained that, the first email is about silk, and added that the second message has two attachments, one of which is a large file.

55. As discussed in detail below at Paragraphs 73 - 77, on or about September 1 and 2, 2017, ZHENG sent GE proprietary information related to Trade Secret Category 1 to ZHANG, including proprietary information about the specific design of certain of GE's test rigs that are used by GE to analyzing the performance of turbine seals.

56. On or about September 6, 2017, ZHANG sent an encrypted audio file to ZHENG in which ZHANG stated that he was in the process of approaching manufacturing facilities in China and offering to perform turbine repair services in order to make money for NTAT. ZHANG also stated that he was interested in "drawings" for gas turbines.

57. On or about October 9, 2017, ZHENG and ZHANG exchanged encrypted text messages concerning ZHENG's travel schedule and arranging a meeting with the 606 Institute, i.e., the Shenyang Aeroengine Research Institute. After learning of ZHENG's travel schedule, ZHANG indicated that ZHANG and ZHENG would travel to meet with the 606 together.

58. On or about October 18, 2017, ZHENG sent an email from the ZHENG Hotmail Account to the ZHANG QQ Account. The email included an attachment with the file name "Desktop-zip.zip." The Desktop-zip.zip file was encrypted using AxCrypt software. The password used to decrypt and open the zip file was Password #1. The zip file contained multiple documents that set forth GE Power "Material Specifications" related to the production of GE brush seals. Notably, the material specifications relate to the development of Brush Seal A, discussed herein at Paragraph 71.

59. On or about October 19, 2017, ZHENG sent an encrypted text message to ZHENG which stated, in relevant part, that the material specifications had been sent to ZHANG.

60. On or about December 4, 2017, ZHANG sent an encrypted text message to ZHENG in which he listed material specifications excerpted from the files contained within Desktop-zip.zip, which had been sent on October 18, 2017. ZHENG responded, in substance and in part, that the material specifications had been sent to ZHANG on October 18th. ZHENG subsequently provided details and then sent a series of photographs that showed the material specifications from a portion of the document that had been previously sent on October 18, 2017.

61. On or about December 11, 2017, ZHANG sent ZHENG a series of photographs of a metal brush seal that ZHANG indicated had been made in China. ZHENG and ZHANG exchanged a series of encrypted text messages concerning flaws in the manufacturing process. ZHENG commented that the product was not up to standard.

62. On or about December 22, 2017, ZHANG and ZHENG exchanged a series of encrypted text messages regarding their business plan and potential for future profits. ZHANG wrote, in substance and in part, that he had worked hard to secure funding and that LTAT must produce results. ZHANG wrote, in substance, we need to make the brush. ZHANG also wrote

that the 606 Institute (i.e., the Shenyang Aeroengine Research Institute) would not be able to use ZHENG and ZHANG's product right away, and the 606 Institute would only sign an R&D cooperation agreement. ZHENG responded, in substance and in part, that if the brush seal were produced, its sales would be certain; however, ZHENG indicated that there was no way to predict when production would begin. ZHENG also explained that LTAT needed to continue to invest in technology and continue the development of other types of models. ZHENG explained that their companies would first go into steam turbines and ground gas turbines. Finally, ZHENG asked if funding from the central government had been awarded.

63. In or around February 2018, ZHENG traveled to China. On or about February 13, 2018, ZHANG sent an encrypted text message to ZHENG that stated, in substance and in part, that ZHANG had spoken with a specific party secretary and ZHANG had learned that the preliminary plan was for ZHENG and ZHANG to travel to Beijing, China for a dinner meeting with an executive of the Aero Engine Corporation of China³ on February 24.

64. On or about February 25, 2018, ZHENG sent an encrypted text message to ZHANG in which ZHENG stated, in substance and in part, that he had learned that every person accepted into the Thousand Talents Program is granted five million RMB in scientific research startup funding. ZHANG replied, in substance and in part, that the funding was six million RMB for research funding such as research in their field. ZHENG replied that the research funding would be "just right" for setting up the test stands.

³ Aero Engine Corporation of China is a Chinese state-owned aerospace and defense conglomerate.

65. On or about February 25, 2018, ZHENG sent an encrypted text message to ZHANG that he was considering quitting his job with GE and moving to the institute; otherwise, explained ZHENG, he would always worry about safety/security.

66. On or about March 10, 2018, ZHENG and ZHANG exchanged a series of encrypted text messages in which they discussed the government's investment in their company and the company's expenditures.

67. On or about July 6, 2018, ZHENG travelled to China.

68. On or about July 17, 2018, ZHENG sent an encrypted text message to ZHANG that provided the names and positions of five visitors from Shenyang Aerospace University.

69. On or about July 18, 2018, LTAT entered into a "Strategic Cooperation Agreement" with Shenyang Aerospace University, a Chinese state-owned university controlled and jointly supported by the People's Government of Liaoning Province and the PRC's State Administration of Science, Technology and Industry for National Defense. A draft of the Strategic Cooperation Agreement indicated that the purpose of the agreement was to jointly develop aero-engine and gas turbine sealing products. ZHENG sent an encrypted text message to ZHANG and attached a document with ZHENG's prepared remarks for the signing ceremony. ZHENG's prepared remarks included, in part, statements that LTAT's main business was aeronautical components and the development of gas and steam turbines. In his remarks, ZHENG noted that LTAT's products could completely replace imported products.

70. The combined value of Trade Secrets Categories 1 – 5 was millions of dollars, including expenses for research and design and other costs of reproducing the trade secrets that ZHENG and ZHANG avoided by the actions described herein.

Overt Acts

The August 22, 2017 Transfer

71. On or about August 22, 2017, ZHENG sent an email from the ZHENG Hotmail Account to the ZHANG QQ Account. The email included an attachment with the file name “overview-zip.zip.” The overview-zip.zip file was encrypted using AxCrypt software. The password used to decrypt and open the zip file was Password #1. Once decrypted, the zip file contained individual files, certain of which contained GE trade secrets associated with Trade Secret Category 1, including a five-page design schematic for the manufacture of Brush Seal A. The zip file also contained a document setting forth GE’s manufacturing method for the production of metal brush seals. Metal brush seals are used in both steam turbines and gas turbines to reduce leakage and help with turbine performance and efficiency. The information contained within these documents could be adapted to allow for manufacture of metal brush seals used in steam and gas turbines, including gas turbines used in aircraft.

72. On or about August 23, 2017, ZHENG sent an encrypted text message to ZHANG that read, in substance and in part, that ZHENG had sent everything to ZHANG. ZHENG asked whether ZHANG had received what ZHENG had sent. ZHANG asked for the code. ZHENG then provided the password to open the zip file: Password #1.

The September 1, 2017 Transfer

73. On or about September 1, 2017, ZHENG sent ZHANG an encrypted text message to ZHANG that stated, in substance and in part, that the model email had been sent to ZHANG’s QQ mailbox. ZHENG then advised ZHANG: after downloading, don’t forget to delete.

74. On or about September 1, 2017, ZHENG sent an email from the ZHENG Hotmail Account to the ZHANG QQ Account. The email included an attachment with the file name “test-zip.zip.” The test-zip.zip file was encrypted using AxCrypt software. The password used to

decrypt and open the zip file was Password #1. This encrypted AxCrypt file contained multiple files related to particular models of seal testing systems used to analyze the performance of seals used in gas and steam turbines. Specifically, the files contained test rig assemblies, design drawings related thereto, and other information that would allow one to manufacture seal testing systems identical to those developed by GE. A test rig assembly is critical for ensuring that the seals used in turbines function properly. GE considers the specific design of its seal testing systems to be trade secrets associated with Trade Secret Category 2. The files also contained design drawings related to a particular face seal.

75. On September 2, 2017, ZHANG sent an encrypted text message to ZHENG in which ZHANG wrote that he was unable to download the file. ZHENG replied and suggested that ZHANG check his deleted files. ZHENG explained that the file was large—approximately 16 megabytes. ZHENG then stated that he resent the materials.

76. On September 2, 2017, ZHENG resent the email from the ZHENG Hotmail Account to the ZHANG QQ Account, which again attached the test-zip.zip file that had been encrypted using AxCrypt software.

77. On or about September 3, 2017, ZHANG sent an encrypted audio file to ZHENG in which ZHANG stated that he had looked at the files and then asked whether two of the files were for test rigs. ZHENG replied in an encrypted audio file and indicated that he had provided information about two different testing systems that are used to test two different internal seal systems.

The June 6, 2017 Transfer

78. On or about June 6, 2017, ZHENG sent an email from the ZHENG GE Email Account to the ZHENG Hotmail Account. The email contained an attachment in the form of an image file titled “NewYear.jpg.” When opened, the NewYear.jpg displayed an image of bamboo

with a red gradient background. However, hidden within the NewYear.jpg file through the use of steganography were two confidential GE files that contained trade secrets within Trade Secret Category 3. Specifically, the two files, which were named “cutting teeth-109E8755.pdf” and “cutting teeth-117E5611.pdf”, held design and manufacturing specifications for part of the turbine blades designed for specific models of GE gas turbines.

The October 23, 2017 Transfer

79. On or about October 23, 2017, ZHENG sent an email from the ZHENG GE Email Account to the ZHENG Hotmail Account. The email text consisted of an article on turbine blades, and the email subject line read, in part, “article – to read.” The email also contained twelve attachments. One of the attachments was an image file titled “MHI-LSB1.png.” When opened, the file displayed an image of turbine blades; however, hidden within the file through the use of steganography was an encrypted AxCrypt file. Specifically, an AxCrypt file named “dln20512.prt” was hidden within the image file “MHI-LSB1.png,” which contained design schematics for a proprietary GE gas turbine combustion system, including the fuel nozzles, which design schematics are GE trade secrets within Trade Secret Category 4.

All in violation of Title 18, United States Code, Section 1831(a)(5).

COUNT 2
[Conspiracy to Commit Theft of Trade Secrets]

80. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

81. From at least March 2016 through on or about August 1, 2018, in the Northern District of New York and elsewhere, defendants **ZHENG Xiaoqing** and **ZHANG Zhaoxi** and others conspired to:

- a. knowingly steal and without authorization appropriate, take, carry away, and conceal, and by fraud, artifice, and deception obtain trade secrets belonging to GE; and
- b. knowingly and without authorization copy, duplicate, sketch, draw, photograph, download, upload, alter, destroy, photocopy, replicate, transmit, deliver, send, mail, communicate, and convey trade secrets belonging to GE; and
- c. knowingly receive, buy, and possess trade secrets belonging to GE, knowing the same to have been stolen, appropriated, obtained, and converted without authorization;

intending to convert a trade secret that is related to a product that is used in and intended for use in interstate and foreign commerce, to the economic benefit of someone other than GE, and intending and knowing that the offense would injure GE.

Manner and Means of the Conspiracy

82. The objects of the conspiracy were carried out, in part, as alleged in Paragraphs 24 – 70 above.

Overt Acts

83. In furtherance of the conspiracy and to effect its objects, ZHENG, ZHANG, and others did commit the overt acts alleged in Paragraphs 71 – 79, among others, in the Northern District of New York and elsewhere.

All in violation of Title 18, United States Code, Section 1832(a)(5).

COUNTS 3 - 4
[Economic Espionage]

84. The allegations contained in Paragraphs 1 – 82 are re-alleged and incorporated as if fully set forth herein.

85. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHENG Xiaoqing**, intending and knowing that he would benefit a foreign government, namely the PRC, and one or more of the Foreign Instrumentalities, (1) did knowingly steal and without authorization appropriate, take, carry away, and conceal, and by fraud, artifice, and deception obtain trade secrets in Trade Secret Categories 1 and 2 belonging to GE; and (2) did knowingly and without authorization copy, duplicate, sketch, draw, photograph, download, upload, alter, destroy, photocopy, replicate, transmit, deliver, send, mail, communicate, and convey trade secrets belonging to GE, by sending emails from the ZHENG Hotmail Account to the ZHANG QQ Account, which attached those files specified in the table below.

Count	Date of Email	File Name	Trade Secret
3	August 22, 2017	overview-zip.zip	Category 1
4	September 1, 2017	test-zip.zip	Category 2

All in violation of Title 18, United States Code, Sections 1831(a)(1)-(2).

COUNTS 5 - 6
[Theft of Trade Secrets]

86. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

87. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHENG Xiaoqing**, intending to convert a trade secret to the economic benefit of someone other than GE, and intending and knowing that the offense would injure GE, (1) did knowingly steal and without authorization appropriate, take, carry away, and conceal, and

by fraud, artifice, and deception obtain trade secrets in Trade Secret Categories 1 and 2 belonging to GE; and (2) did knowingly and without authorization copy, duplicate, sketch, draw, photograph, download, upload, alter, destroy, photocopy, replicate, transmit, deliver, send, mail, communicate, and convey trade secrets in Trade Secret Categories 1 and 2 belonging to GE, by sending emails from the ZHENG Hotmail Account to the ZHANG QQ Account, which attached those files specified in the table below.

Count	Date of Email	File Name	Trade Secret
5	August 22, 2017	overview-zip.zip	Category 1
6	September 1, 2017	test-zip.zip	Category 2

All in violation of Title 18, United States Code, Sections 1832(a)(1)-(2).

COUNTS 7 - 8
[Economic Espionage]

88. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

89. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHENG Xiaoqing**, intending and knowing that he would benefit a foreign government, namely the PRC, and one or more of the Foreign Instrumentalities, did knowingly steal and without authorization appropriate, take, carry away, and conceal, and by fraud, artifice, and deception obtain trade secrets in Trade Secret Categories 3 and 4 belonging to GE by sending an email from the ZHENG GE Email Account to the ZHENG Hotmail Account, which attached those files specified in the table below.

Count	Date of Email	File Names	Trade Secret
7	June 6, 2017	NewYear.jpg	Category 3
8	October 23, 2017	MHI-LSB1.png	Category 4

All in violation of Title 18, United States Code, Section 1831(a)(1).

COUNTS 9 - 10
[Theft of Trade Secrets]

90. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

91. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHENG Xiaoqing**, intending to convert a trade secret to the economic benefit of someone other than GE, and intending and knowing that the offense would injure GE, did knowingly steal and without authorization appropriate, take, carry away, and conceal, and by fraud, artifice, and deception obtain trade secrets in Trade Secret Categories 3 and 4 belonging to GE by sending an email from the ZHENG GE Email Account to the ZHENG Hotmail Account, which attached those files specified in the table below.

Count	Date of Email	File Names	Trade Secret
9	June 6, 2017	NewYear.jpg	Category 3
10	October 23, 2017	MHI-LSB1.png	Category 4

All in violation of Title 18, United States Code, Section 1832(a)(1).

COUNT 11
[Economic Espionage]

92. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

93. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHANG Zhaoxi**, intending and knowing that he would benefit a foreign government, namely the PRC, and one or more of the Foreign Instrumentalities, did knowingly receive, buy, and possess trade secrets in Trade Secrets Category 1 belonging to GE, knowing the same to have been stolen, appropriated, obtained, and converted without authorization; by

receiving and possessing an email in the ZHANG QQ Account with the attached file specified in the table below.

Count	Date of Email	File Name	Trade Secret
11	August 22, 2017	overview-zip.zip	Category 1

All in violation of Title 18, United States Code, Section 1831(a)(3).

COUNT 12
[Theft of Trade Secrets]

94. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

95. On or about the dates listed in the table below, in the Northern District of New York and elsewhere, defendant **ZHANG Zhaoxi**, intending to convert a trade secret to the economic benefit of someone other than GE, and intending and knowing that the offense would injure GE, did knowingly receive, buy, and possess trade secrets in Trade Secrets Category 1 belonging to GE, knowing the same to have been stolen, appropriated, obtained, and converted without authorization; by receiving and possessing an email in the ZHANG QQ Account with the attached file specified in the table below.

Count	Date of Email	File Name	Trade Secret
12	August 22, 2017	overview-zip.zip	Category 1

All in violation of Title 18, United States Code, Section 1832(a)(3).

COUNT 13
[Theft of Trade Secrets]

96. The allegations contained in Paragraphs 1 – 79 are re-alleged and incorporated as if fully set forth herein.

97. On or about July 5, 2018, in the Northern District of New York and elsewhere, defendant **ZHENG Xiaoqing**, intending to convert a trade secret to the economic benefit of someone other than GE, and intending or knowing that the offense would injure GE, knowingly stole and without authorization appropriated, took, carried away, concealed, and by fraud, artifice and deception obtained GE trade secrets related to sealing and optimizing turbine technology (Trade Secret Category 5), which related to a product and service used in and intended for use in interstate and foreign commerce, in violation of Title 18, United States Code, Section 1832(a)(1).

98. On or about July 5, 2018, ZHENG emailed himself approximately 40 files that were the property of GE from the ZHENG GE Email Account to the ZHENG Hotmail Account. ZHENG used encryption and steganography to avoid detection when removing GE's property and proprietary data from GE Power facilities.

99. GE determined that the approximately 40 files related to sealing and optimizing turbine technology (Trade Secret Category 5) – information that GE considers to be proprietary and secret. These files held independent economic value from not being generally known to the public, and the trade secrets in the files resulted from research and design expenditures that ZHENG avoided by the actions alleged herein.

100. ZHENG used steganography to steal the files from GE Power. Through the steganography technique, ZHENG placed the aforementioned electronic files into the binary code of a separate electronic file on the computer—an otherwise innocuous-looking digital photograph of a sunset. ZHENG then e-mailed himself the digital photograph file of the sunset, which secretly contained the hidden GE electronic files containing GE's proprietary data.

101. ZHENG took great care to conceal what he was doing with GE's proprietary data files. ZHENG not only hid the data he was staging in a "temp folder" by encrypting it so GE could

not see what files he was saving, but he also used steganography to hide the fact that he sent GE's data to his personal e-mail address (i.e. concealing the data within the binary code of the digital photograph).

All in violation of Title 18, United States Code, Section 1832(a)(1).

COUNT 14
[False Statements or Entries Generally]

102. The allegations contained in Paragraphs 1 – 79 and 96 - 101 are re-alleged and incorporated as if fully set forth herein.

103. On or about August 1, 2018, in the Northern District of New York, defendant **ZHENG Xiaoqing** knowingly and willfully made materially false, fictitious, and fraudulent statements and representations in a matter within the jurisdiction of the executive branch of the Government of the United States, in violation of Title 18, United States Code, Section 1832(a)(1).

104. ZHENG falsely stated to FBI agents that he had never given or emailed any of GE's confidential information that ZHENG had removed from GE's systems or premises to anyone in China. In truth and fact, however, ZHENG then well knew, he had sent GE files to persons associated with ZHENG's companies in China (e.g., ZHANG) via email using encrypted files on a number of occasions, including as described herein at Counts 1 – 12.

All in violation of Title 18, United States Code, Section 1001(a)(2).

CRIMINAL FORFEITURE ALLEGATION

105. The allegations contained in Counts 1 through 13 of this Superseding Indictment are hereby realleged and incorporated by reference as if fully set forth herein for the purpose of alleging forfeiture pursuant to Title 18, United States Code, Sections 1834 and 2323(b). Upon conviction of any of those offenses, the defendants, **ZHENG Xiaoqing** and **ZHANG Zhaoxi** shall forfeit the following property, real or personal, to the United States:

- a. Any article, the making or trafficking of which, is prohibited under 18 U.S.C. Chapter 90;
- b. Any property used, or intended to be used, in any manner or part to commit or facilitate a violation of 18 U.S.C. Chapter 90; and
- c. Any property constituting or derived from any proceeds obtained directly or indirectly as a result of a violation of 18 U.S.C. Chapter 90.

The property to be forfeited includes, but is not limited to, the following:

United States Currency

1. \$50,000.00

Devices

1. A Dell Precision Desktop Workstation 3600, serial number: 7QK0RW1; and
2. An iPhone X, white in a black case, serial number: F17VN3X5JCLJ

Money Judgment

1. A sum of United States currency equal to the amount of proceeds obtained directly and indirectly as a result of the commission of the offenses charged in Counts 1 through 13 of this Indictment.

If any of the property described above, as a result of any act or omission of a defendant:

- a. cannot be located upon exercise of due diligence;
- b. has been placed beyond the jurisdiction of the Court;
- c. has been transferred or sold to, or deposited with a third party;
- d. has been substantially diminished in value; or
- e. has been commingled with other property which cannot be divided without difficulty;

the United States of America shall be entitled to forfeiture of substitute property pursuant to Title 21, United States Code, Section 853(p), as incorporated by Title 18, United States Code, Section 2323(b).

All pursuant to Title 18, United States Code, Sections 1834 and 2323(b).

Dated: August 10, 2021

REDACTED

Grand Jury Foreperson

ANTOINETTE T. BACON
Acting United States Attorney

By:

Richard D. Belliss
Assistant United States Attorney
Bar Roll No. 515295